FORM PTO-1390 (REV. 1-98) U S DEPARTMENT OF COMMENCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER	
172A 3075 PCT	
U.S. APPLICATION NUMBER (if known, see 37 C.F.R. 1.5)	09/762846

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/JP00/03807	June 12, 2000	June 18, 1999

TITLE OF INVENTION: PIEZO-OSCILLATOR

APPLICANT(S) FOR DO/EO/US: TOSHIKAZU UCHIYAMA

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☐ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☒ has been transmitted by the International Bureau.
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
   b. ☐ have been transmitted by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☒ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).
11. ☐ Applicant claims small entity status.

Items 12. to 17. below concern document(s) or information included:

12. ☒ An Information Disclosure Statement under 37 C.F.R. 1.97 and 1.98.
13. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 C.F.R. 3.28 and 3.31 is included.
14. ☒ A FIRST preliminary amendment.
    ☐ A SECOND or SUBSEQUENT preliminary amendment.
15. ☐ A substitute specification.
16. ☐ A change of power of attorney and/or address letter.
17. ☒ Other items or information:
    a. Copy of Form PCT/IB/308 (Notice re Application to the Designated offices)
    b. Five (5) sheets of drawings
    c. Copy of Form PCT/ISA/210 (International Search Report)
    d. Change of Correspondence Address

U.S. APPLICATION NO. (if known, see 37 C.F.R. 1.5)	INTERNATIONAL APPLICATION NUMBER	ATTORNEY'S DOCKET NUMBER
09/762846	PCT/JP00/03807	172A 3075 PCT

18. ☒ The following fees are submitted:

CALCULATIONS PTO USE ONLY

BASIC NATIONAL FEE (37 C.F.R. 1.492(a)(1)-(5)):

Neither international preliminary examination fee (37 C.F.R. 1.482) nor international search fee (37 C.F.R. 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO of JPO **$1000**

International preliminary examination fee (37 C.F.R. 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO **$860**

International preliminary examination fee (37 C.F.R. 1.482) not paid to USPTO but international search fee (37 C.F.R. 1.445(a)(2)) paid to USPTO **$710**

International preliminary examination fee (37 C.F.R. 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) **$690**

International preliminary examination fee (37 C.F.R. 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) **$900**

ENTER APPROPRIATE BASIC FEE AMOUNT =	$ 860
Surcharge of **$130** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 C.F.R. 1.492(e)).	$ 0

CLAIMS	NUMBER FILED	NUMBER ALLOWED	NUMBER EXTRA	RATE	
Total claims	11	20	0	$ 18	$ 0
Independent claims	5	3	2	$ 80	$ 160
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+	**$270**	$ 270

TOTAL OF ABOVE CALCULATIONS =	$ 1,290
Reduction of 1/2 for filing by small entity, if applicable.	$ 0
SUBTOTAL =	$1,290
Processing fee of **$130** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 C.F.R. 1.492(f)). +	$ 0
TOTAL NATIONAL FEE =	$1,290
Fee for recording the enclosed assignment (37 C.F.R. 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 C.F.R. 3.28, 3.31). **$40** per property +	$ 40
TOTAL FEES ENCLOSED =	$1,330
	Amt. Refunded $
$	**Amt. charged**

a. ☒ Checks in the amounts of $40 and $1,290 to cover the above fees are enclosed.

b. ☐ Please charge my Deposit Account No. 11-1445 in the amount of _____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 11-1445. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 C.F.R. 1.494 or 1.495 has not been met, a petition to revive (37 C.F.R. 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:
KODA & ANDROLIA
2029 Century Park East, Suite 3850
Los Angeles, CA 90067-3024
Dated: February 9, 2001

SIGNATURE

H. Henry Koda
REG.NO. 27,729

Form PTO-1390 (REV 1-98)

Transmittal Letter to the United States Designated Office (DO/US)—Entry Into National Stage under 35 U.S.C. 371—PTO 1390 [13-7]

172A 3075 PCT

Express Mail EL719793093US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:	Art Unit: --
TOSHIKAZU UCHIYAMA	Examiner: --
International Appl. No.: PCT/JP00/03807	
International Appl. Date: June 12, 2000	
For: PIEZO-OSCILLATOR	

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

Please amend the above-identified application as follows:

IN THE CLAIMS:

In Claim 7, line 1, delete "6";

line 2, delete "it is possible to confirm"; and

line 3, after "piezo-vibrator", insert --are confirmed--.

Add new claim 9 as follows:

--9. A piezo-oscillator according to claim 6, wherein drive level dependency characteristics of said piezo-vibrator are confirmed by controlling a drive level of said piezo-vibrator--.

REMARKS

Applicant respectfully submits that the above amendments to the claims are only for the purposes of rewriting the Claim 7 so that it complies with the requirements of 37 CFR 1.75 and to clarify the description of the Claim 7. No new matter is introduced via the amendments.

Accordingly, it is respectfully requested that this Preliminary Amendment be entered and the case be favorably considered.

Please charge any additional costs incurred by way of this amendment to Koda and Androlia Deposit Account No. 11-1445.

Respectfully submitted,

KODA & ANDROLIA

2029 Century Park East
Suite 3850
Los Angeles, CA 90067
Tel: (310) 277-1391
Fax: (310) 277-4118
Dated: February 9, 2001

By: _____
H. Henry Koda
Reg. No. 27,729

PIEZO-OSCILLATOR

TECHNICAL FIELD

The present invention relates to a piezo-oscillator, and more particularly, to a small piezo-oscillator having excellent aging characteristics.

BACKGROUND TECHNIQUE

In recent years, as communications equipment is reduced in size, a reference signal source used for the equipment is required to be small in size, and a quartz oscillator shown in Figs. 5 for example has been proposed.

Fig. 5(a) is a sectional view of a structure of a conventional quartz oscillator, and Fig. 5(b) is a circuit diagram of the conventional quartz oscillator.

As shown in Fig. 5(a), the quartz oscillator 100 includes an integrated amplifier circuit 101, a quartz vibrator 102, a ceramic container 103 having a recess for accommodating the amplifier circuit 101 and the quartz vibrator 102 therein, and a metal lid 104. After the amplifier circuit 101 is mounted in on a bottom surface of the recess of the ceramic container 103, the quartz vibrator 102 is mounted such as to cover an upper surface of the amplifier circuit 101, and the ceramic container 103 is sealed by the lid 104 such as to cover these members.

The quartz vibrator 102 and other electron parts are mounted in the common accommodation container in this manner,

thereby realizing a compact quartz oscillator 100.

However, with the above structure, it is impossible to check a drive level dependence characteristics (DLD characteristics, hereinafter) such as variation in oscillation frequency with respect to drive level variation of the quartz vibrator 102.

That is, the DLD characteristics may be varied due to variation in producing procedure and producing conditions or the like.

Since the DLD characteristics affects the stability of frequency and characteristics and reproducibility of the quartz vibrator 102, it is indispensable to check the vibrator after it was completed.

A common method for checking the DLD characteristics of the quartz vibrator 102 is to change the drive level of the quartz vibrator 102 incorporated in the oscillator, and to check deviation of oscillation frequency with respect to variation of the drive level.

In the case of the quartz oscillator 100, since the quartz vibrator 102 and the amplifier circuit 101 are accommodated in the same container, the quartz vibrator 102 alone can not be checked. It seems possible to control a voltage value of a power source Vcc to be supplied to the oscillator circuit of the quartz oscillator 100, thereby adjusting the amplification action of the amplifier circuit 101 to control the drive level of the quartz vibrator 102.

However, since the quartz oscillator 100 output stable

frequency signal even if the supplied power source voltage is varied, at least one of a constant-voltage circuit 105 and a constant-current circuit 106 is provided in the oscillator circuit as shown in Fig. 5(b) in many cases.

Therefore, in the case of the quartz oscillator 100 having such a structure, even if the power source voltage value is controlled, since the drive level of the quartz vibrator 102 is not varied, there is a problem that DLD characteristics can not be checked.

The present invention has been accomplished to solve the above problems of the conventional constant-voltage oscillator, and it is an object of the invention to provided a small quartz oscillator in which the DLD characteristics can be measured after it is packaged even if a constant-voltage circuit or constant-current circuit is included in the circuit.

DISCLOSURE OF THE INVENTION

To achieve the above object, according to the invention described in a first aspect, there is provided a piezo-oscillator comprising an oscillator circuit including a piezo-vibrator and an amplifier circuit, and a constant-voltage circuit, in which a power source and the oscillator circuit are connected through the constant-voltage circuit to supply a constant voltage to the oscillator circuit, wherein when a voltage of the power source is equal to or higher than a predetermined value, a function of the constant-voltage circuit is invalidated.

According to a second aspect, there is provided a piezo-oscillator comprising a piezo-oscillator including a piezo-vibrator, an amplifier circuit and a constant-current circuit, wherein when a voltage of the power source is equal to or higher than a predetermined value, a function of the constant-current circuit is invalidated.

According to a third aspect, there is provided a piezo-oscillator comprising an oscillator circuit including a piezo-vibrator and an amplifier circuit, a constant-voltage circuit and frequency control voltage section, in which a power source and the oscillator circuit are connected through the constant-voltage circuit to supply a constant voltage to the oscillator circuit, wherein when a voltage to be supplied to the frequency control voltage section is equal to or higher than a predetermined value, a function of the constant-voltage circuit is invalidated.

According to a fourth aspect, there is provided a piezo-oscillator comprising a piezo-oscillator including a piezo-vibrator, an amplifier circuit, a constant-current circuit and a frequency control voltage section, wherein when a voltage to be supplied to the frequency control voltage section is equal to or higher than a predetermined value, a function of the constant-current circuit is invalidated.

According to a fifth aspect, in addition to the first or the third aspect, within in a voltage range in which the function of the constant-voltage circuit is invalidated, the power source voltage is controlled, and a drive level of the

piezo-vibrator is controlled by changing a voltage to be supplied to the amplifier circuit.

According to a sixth aspect, in addition to the second or the fourth aspect, within in a voltage range in which the function of the constant-voltage circuit is invalidated, the power source voltage is controlled, and a drive level of the piezo-vibrator is controlled by changing a voltage to be supplied to the amplifier circuit.

According to a seventh aspect, in addition to the fifth or the sixth aspect, it is possible to confirm drive level dependency characteristics of the piezo-vibrator by controlling a drive level of the piezo-vibrator.

According to an eighth aspect, there is provided a piezo-oscillator comprising an oscillator circuit including a piezo-vibrator and an amplifier circuit for supplying electric power to the oscillator circuit through a constant-voltage circuit or a constant-current circuit, wherein the constant-voltage circuit or the constant-current circuit is provided with a current bypass switch, a function of the constant-voltage circuit or the constant-current circuit is invalidated by controlling the switch from outside.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a circuit diagram of an embodiment of a quartz oscillator based on the present invention;

Fig. 2 is a circuit diagram of a control circuit of the quartz oscillator based on the invention;

Fig. 3 is a circuit diagram of another embodiment of the of the quartz oscillator based on the invention;

Fig. 4 is a circuit diagram of a control circuit of the quartz oscillator based on the invention; and

Figs. 5 are views showing structure of a conventional quartz oscillator, wherein (a) is a side sectional view of the conventional quartz oscillator, and (b) is a circuit diagram of the conventional quartz oscillator.

BEST MODE FOR CARRYING OUT THE INVENTION

The present invention will be explained in detail based on the illustrated embodiments.

Fig. 1 is a circuit diagram of an embodiment of a quartz oscillator based on the present invention.

A circuit shown in Fig. 1 has a structure in which an amplifier circuit 2 is cascaded to a typical Colpitts quartz oscillator 1. A power source Vcc, the amplifier circuit 2 and a constant-voltage circuit 3 are connected through a switch circuit 4. The switch circuit 4, a switch circuit 5 (which will be described later) included in the amplifier circuit 2 are connected to a control circuit 6 for controlling these switch circuits.

In the oscillator circuit 1, a resistor R1 is connected between a ground and a base of a transistor Q1 that is an amplifier element. A capacitor C1 is connected between the base and an emitter, and a capacitor C2 between the emitter and the ground. A resistor R2 is connected in parallel to the capacitor C2.

A resistor R3 is connected between the base of the transistor Q1 cascaded to the amplifier circuit 2 and a base of a transistor Q2.

In the amplifier circuit 2, in addition to the above-explained connection relation, a power source line 7 and a collector of the transistor Q2 are connected through a resistor R4, and a constant-current circuit 8 and a resistor R5 are connected to the base of the transistor Q2, and the amplifier circuit 2 is structured such that any of them is connected to the power source line 7 by the switch circuit 5.

The power source line 7 is structured such that the power source line 7 is connected any one of the constant-voltage circuit 4 and the power source Vcc by the switch circuit 4.

Fig. 2 is a circuit diagram showing one example of the control circuit 6. Control of the switch circuit 4 is mainly explained.

As shown in Fig. 2, the control circuit 6 includes a voltage comparing section 9. The control circuit 6 outputs a signal to the switch circuit 4 as a control signal, and controls a switch 10 and a switch 11 provided in the switch circuit 4.

A positive terminal of the voltage comparing section 9 of the control circuit 6 is connected to the power source Vcc divided by a resistor R6 and a resistor R7 so as to supply voltage. A collector and a base of a transistor Q3 are connected, and a negative terminal of the voltage comparing section 9 is connected to the collector. As a result, the power source Vcc is supplied to the other negative terminal via a resistor R8.

An emitter of a PNP transistor Q4 (transistor Q4, hereinafter) of the switch 10 connects to the power source Vcc, and a collector of the transistor Q4 connects to the voltage comparing section 9 of the control circuit 6. The emitter of the transistor Q4 connects to the base through a resistor R9, and the base connects to a collector of a transistor Q5 whose emitter is grounded. The base of the transistor Q5 is also grounded via a resistor R10, and connected to an output terminal of the comparing section 9 through a resistor R11.

An emitter of a PNP transistor Q6 (transistor Q6, hereinafter) of the switch 11 connects to an output terminal of the constant-voltage circuit 3. A base of the transistor Q6 connects to an output terminal OP of the control circuit 6. The emitter is connected the base and the output terminal of the comparing section 9 via a resistor R12.

The operation of the control circuit 6 will be explained.

First, in the quartz oscillator, the power source voltage (Vcc) is usually set up in a prescribed range for oscillation, and the voltage at oscillation is defined as operation voltage (Vccd), and voltage higher than Vccd is defined as non-operation voltage (Vcch).

A divided voltage ratio of the resistor R6 and the resistor R7 is set such that when the Vccd is maximum, voltage (voltage between the base and the emitter of the transistor Q3) of the positive terminal and voltage of the negative terminal of the comparator 12 become equal to each other.

Therefore, an output signal of the comparing section 9

becomes LOW and outputs 0V when the Vcc is in the range of Vccd.

At that time, an electric potential of the base of the transistor Q6 becomes lower than that of the emitter and thus, the transistor Q6 is actuated. Further, since the transistor Q5 is not actuated, the transistor Q4 is not actuated, thus the switch 10 is brought into OFF State. As a result, the constant-voltage circuit 3 and the power source line 7 are connected, and the constant-voltage circuit function is functioned.

On the other hand, when the Vcc is equal to or higher than the Vcch, the output signal of the comparing section 9 becomes HI and outputs voltage Vh (voltage Vh>constant-voltage circuit output voltage).

At that time, in the switch 11, since the electric potential of the base of the transistor Q6 becomes higher than that of the emitter, the transistor Q6 is not actuated. In addition, the transistor Q5 of the switch 10 is actuated so that the base of the transistor Q4 is grounded, the transistor Q4 is actuated. As a result, the power source Vcc and the power source line 7 are directly connected to each other and thus, the constant-voltage circuit function becomes invalid.

The switch circuit 5 is operated in the same manner as the switch circuit 4. In the switch circuit 5, when the voltage is in the range of Vccd, the constant-current circuit 8 is connected to the power source line 7, and when the voltage is non-operation voltage Vcch, the resistor R5 is connected to the power source line 7.

According to the above-explained operation, when the operation voltage is 5V ± 1V, if the voltage of the power source Vcc is 6V or higher, it is possible to invalidate the functions of the constant-voltage circuit 3 and the constant-current circuit 8. Therefore, it is possible to control the operation of the amplifier circuit by the voltage of the power source Vcc without affecting the oscillation when the quartz oscillator is used. Therefore, it is possible to control the drive level of the quartz oscillator and thus, the DLD characteristics can be checked after the package.

Fig. 3 is a circuit diagram showing another embodiment of the quartz oscillator based on the present invention. Fig. 4 shows an example of circuit structure of the control circuit 6 shown in Fig. 3.

The quartz oscillator circuit shown in Fig. 3 is different from that shown in Fig. 1 in that a frequency control voltage section AFC is connected to the positive terminal of the comparing section 9 as shown in Fig. 4 such that voltage of the frequency control voltage section AFC is supplied to the positive terminal, thereby controlling the switch circuit 4 and the switch circuit 5 by the voltage signal from the frequency control voltage section AFC.

With this arrangement, it is possible to invalidate the functions of the constant-voltage circuit 3 and the constant-current circuit 8 even if the voltage is in a range of the operation voltage Vccd. Therefore, it is possible to control the drive level over a wider range.

Similarly, in the examples shown in Figs. 1 and 2, it is possible to separately provide a switch control terminal, and to control a circuit that bypasses the constant-voltage circuit and the constant-current circuit irrespective of the power source voltage value.

The present invention has been described while taking a case of the switch circuit constituted using the transistors, but the invention is not limited to this structure, and another switch circuit having a different structure may also be used if the switch circuit performs a switch operation.

The present invention has been explained while taking the case of the oscillator using the quartz elements, the invention is not limited to this, and it is apparent that the invention may be applied to another piezo-oscillator other than quartz oscillator.

In the piezo-oscillator based on the present invention, as explained above, it is possible to invalidate the control of the constant-voltage circuit and the constant-current circuit at operation voltage or higher even if the piezo-vibrator and the oscillator circuit including the constant-voltage circuit and the constant-current circuit are contained in the same container. Therefore, it is possible to control the drive level of the quartz vibrator and thus, there is effect that the DLD characteristics can be measured.

CLAIMS

1. A piezo-oscillator comprising an oscillator circuit including a piezo-vibrator and an amplifier circuit, and a constant-voltage circuit, in which a power source and said oscillator circuit are connected through said constant-voltage circuit to supply a constant voltage to said oscillator circuit, wherein when a voltage of said power source is equal to or higher than a predetermined value, a function of said constant-voltage circuit is invalidated.

2. A piezo-oscillator comprising a piezo-oscillator including a piezo-vibrator, an amplifier circuit and a constant-current circuit, wherein when a voltage of said power source is equal to or higher than a predetermined value, a function of said constant-current circuit is invalidated.

3. A piezo-oscillator comprising an oscillator circuit including a piezo-vibrator and an amplifier circuit, a constant-voltage circuit and frequency control voltage section, in which a power source and said oscillator circuit are connected through said constant-voltage circuit to supply a constant voltage to said oscillator circuit, wherein when a voltage to be supplied to said frequency control voltage section is equal to or higher than a predetermined value, a function of said constant-voltage circuit is invalidated.

4. A piezo-oscillator comprising a piezo-oscillator including a piezo-vibrator, an amplifier circuit, a constant-current circuit and a frequency control voltage section, wherein when a voltage to be supplied to said frequency

control voltage section is equal to or higher than a predetermined value, a function of said constant-current circuit is invalidated.

5. A piezo-oscillator according to claim 1 or 3, wherein within in a voltage range in which said function of said constant-voltage circuit is invalidated, said power source voltage is controlled, and a drive level of said piezo-vibrator is controlled by changing a voltage to be supplied to said amplifier circuit.

6. A piezo-oscillator according to claim 2 or 4, wherein within in a voltage range in which said function of said constant-voltage circuit is invalidated, said power source voltage is controlled, and a drive level of said piezo-vibrator is controlled by changing a voltage to be supplied to said amplifier circuit.

7. A piezo-oscillator according to claim 5 or 6, wherein it is possible to confirm drive level dependency characteristics of said piezo-vibrator by controlling a drive level of said piezo-vibrator.

8. A piezo-oscillator comprising an oscillator circuit including a piezo-vibrator and an amplifier circuit for supplying electric power to said oscillator circuit through a constant-voltage circuit or a constant-current circuit, wherein said constant-voltage circuit or said constant-current circuit is provided with a current bypass switch, a function of said constant-voltage circuit or said constant-current circuit is invalidated by controlling said switch from outside.

ABSTRACT

In order to realize a small quartz oscillator having high frequency stability and capable of measuring DLD characteristics, in a piezo-oscillator comprising an oscillator circuit including a piezo-vibrator and an amplifier circuit, and a constant-voltage circuit, in which a power source and the oscillator circuit are connected through the constant-voltage circuit to supply a constant voltage to the oscillator circuit, depending on the said power source voltage, a function of the constant-voltage circuit is invalidated. With this structure, even after the piezo-vibrator and other electron circuits are integrally assembled, it is possible to adjust the drive level of the quartz vibrator and to measure the DLD characteristics by changing the power source voltage.

Fig. 1

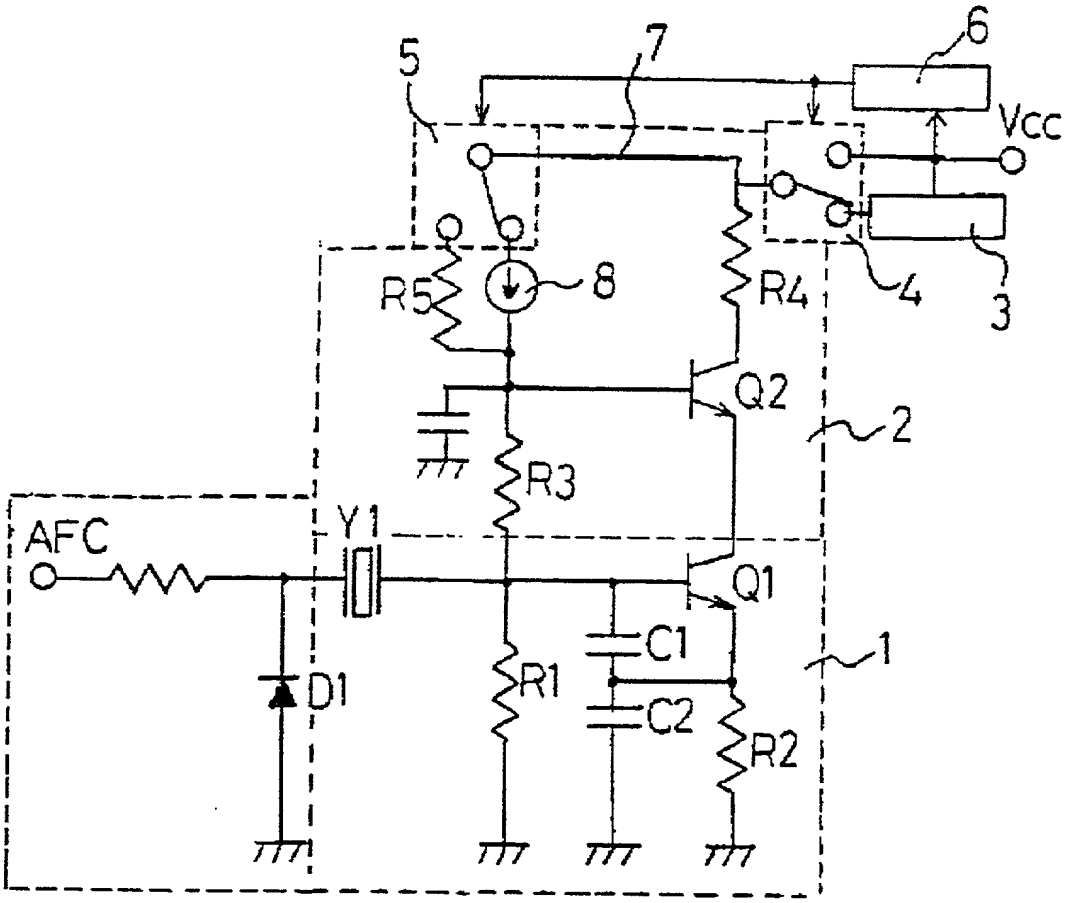


Fig. 2

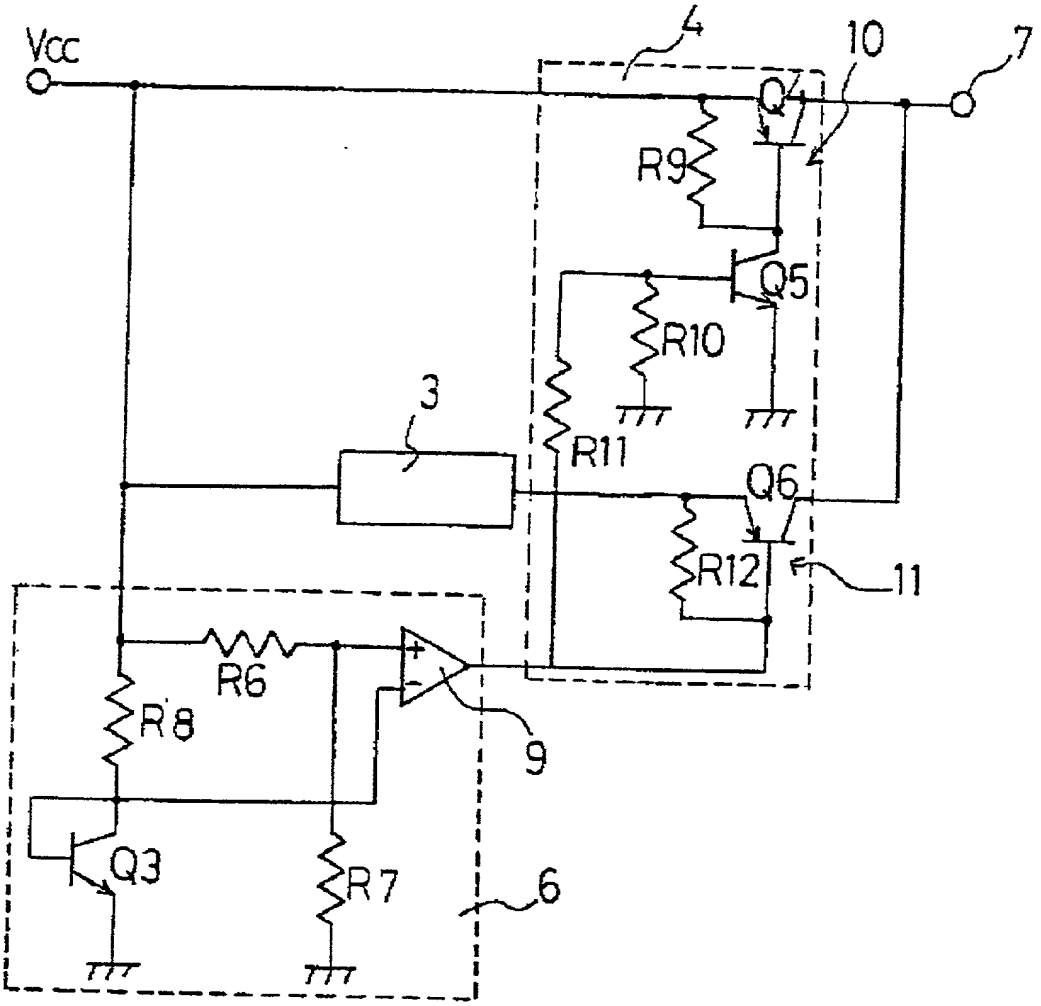


Fig. 3

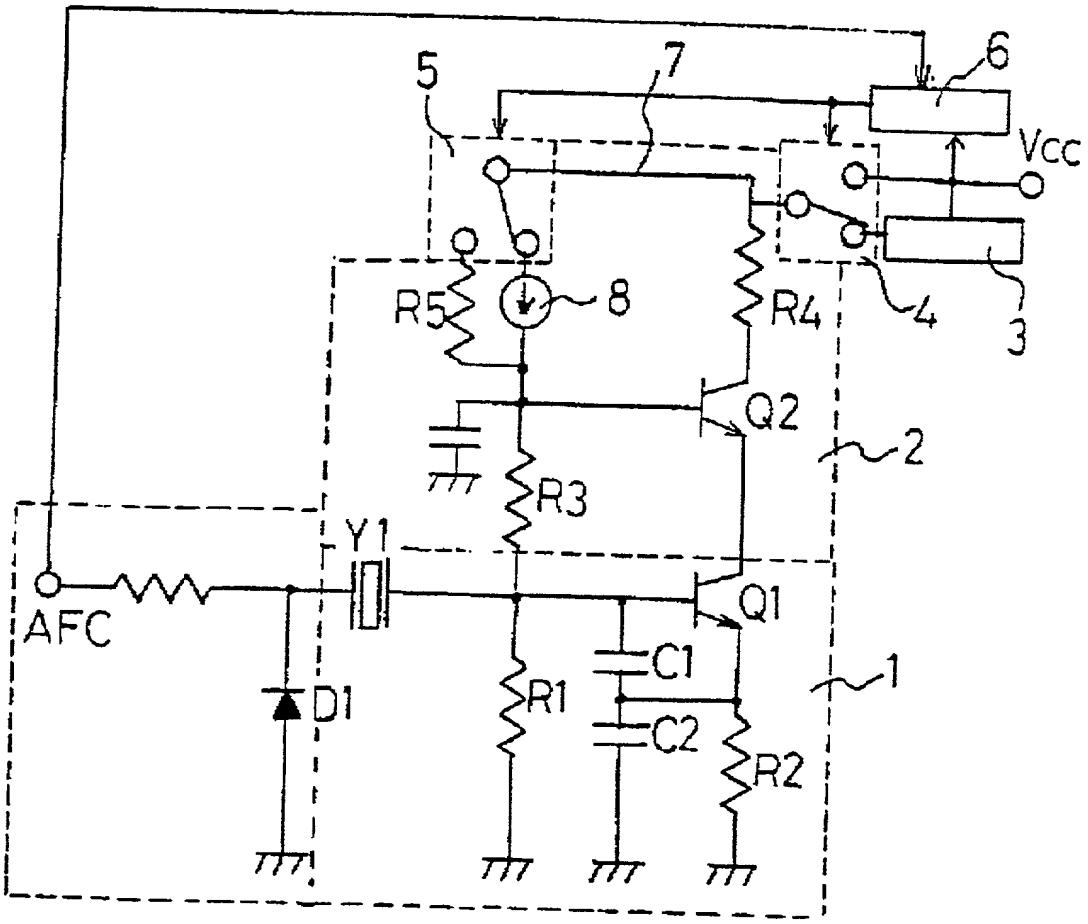


Fig. 4

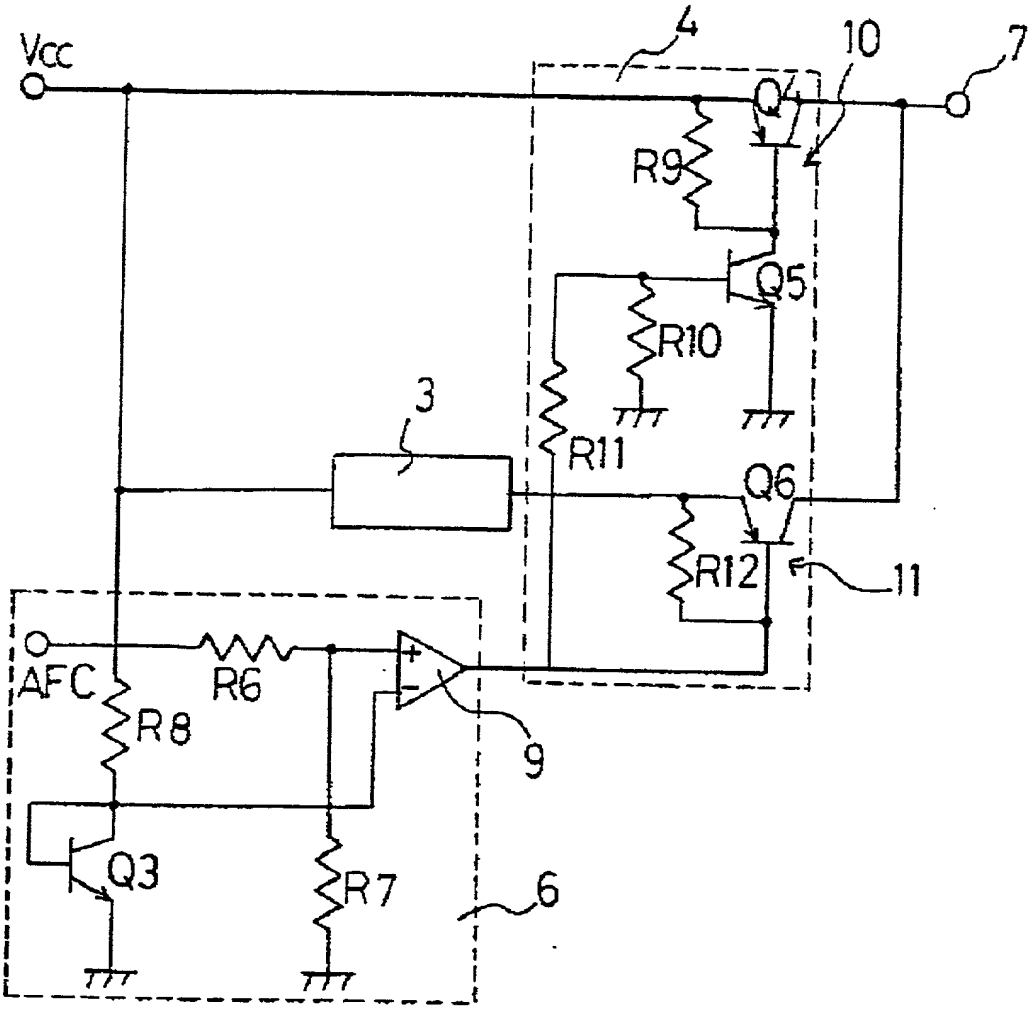
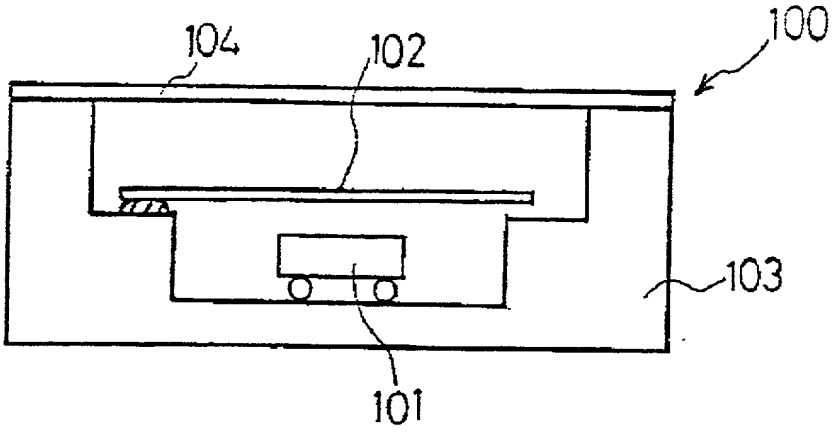
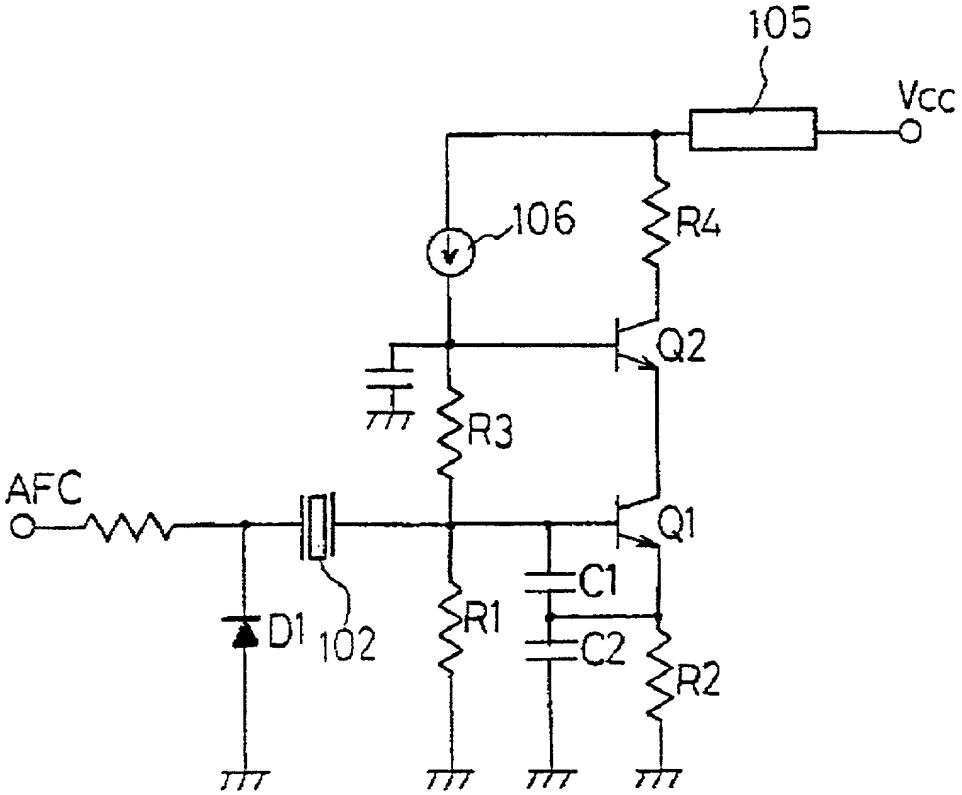


Fig. 5



(a)



(b)

DECLARATION AND POWER OF ATTORNEY

PATENT (U.S.A.)
KODA & ANDROLIA
ATTORNEY'S DOCKET NO.
172A 3075 PCT

As a below named inventor, I declare that :

My residence, post office address and citizenship are stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

PIEZO-OSCILLATOR ..... the specification of which is

attached hereto unless the following box is checked:

☐ was filed on _____ as United States Application Number or PCT International Application Number _____

and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR § 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. § 119(a)-(d) or § 365(b) of any foreign application(s) for patent or Inventor's certificate, or § 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the appropriate line, any foreign application for patent or Inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed.

PRIOR FOREIGN APPLICATION(S)

COUNTRY	APPLICATION NUMBER	DATE OF FILING Month	Day	Year	PRIORITY CLAIMED
Japan	11-173303	6	18	1999	YES X NO ____
					YES ____ NO ____
					YES ____ NO ____
					YES ____ NO ____

I hereby claim the benefit under 35 U.S.C. § 119(e) of any United States provisional application(s) listed below.

APPLICATION NUMBER	FILING DATE

I hereby claim the benefit under 35 U.S.C. § 120 of any United States application(s), or § 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. § 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR § 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application.

APPLICATION NUMBER	FILING DATE	STATUS – PATENTED, PENDING, ABANDONED
PCT/JP00/03807	June 12, 2000	Pending

☐ POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) to prosecute this application and transact all business in the Patent and Trademark Office connected herewith.
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I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements and the like may jeopardize the validity of the application or any patent issued thereon.

SIGNATURE OF INVENTOR 201	SIGNATURE OF INVENTOR 202
Toshikazu Uchiyama	
DATE January 29, 2001	DATE
SIGNATURE OF INVENTOR 203	SIGNATURE OF INVENTOR 204
DATE	DATE

☐ Additional inventors are named on separate Declarations attached hereto.

FORM DPA PAT (REV 07/99)